

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A diamond n-type semiconductor comprising a first diamond semiconductor which has n-type conduction and in which a distortion or defect is artificially formed,

wherein ~~[[in]]~~ said first diamond semiconductor, ~~a conductor exhibits an electron concentration negatively correlated~~ has an n-type dopant concentration adjusted by vapor-phase growth such that an electron concentration of said first diamond semiconductor exhibits a negative correlation with temperature, in a temperature range ~~which has~~ having a width of 100°C or more and ~~[[is]]~~ included within a temperature region from 0°C to 300°C.

2. (Currently Amended) A diamond n-type semiconductor according to claim 1, wherein, ~~in~~ said first diamond semiconductor, ~~the conductor exhibits a Hall coefficient positively correlated~~ has a Hall coefficient exhibiting a positive correlation with temperature, in ~~[[a]]~~ the temperature range ~~which has a width of 100°C or more and is included within the temperature region from 0°C to 300°C.~~

3. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein the temperature range, included within the temperature region from 0°C to 300°C, has a width of over 200°C or more.

4. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein said first diamond semiconductor has a resistivity of 500 Ωcm or less at a temperature within the temperature region from 0°C to 300°C.

5. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein the electron concentration of said first diamond semiconductor is always 10^{16} cm^{-3} or more in the temperature region from 0°C to 300°C .

6. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein said first diamond semiconductor contains more than $5 \times 10^{19} \text{ cm}^{-3}$ in total of at least one kind of donor element.

7. (Original) A diamond n-type semiconductor according to claim 6, wherein said first diamond semiconductor contains at least P (phosphorus) as the donor element.

8. (Original) A diamond n-type semiconductor according to claim 6, wherein said first diamond semiconductor contains at least S (sulfur) as the donor element.

9. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein said first diamond semiconductor contains an impurity element other than a donor element together with the donor element.

10. (Previously Presented) A diamond n-type semiconductor according to claim 9, wherein said first diamond semiconductor contains Si of $1 \times 10^{17} \text{ cm}^{-3}$ or more as the impurity element.

11. (Previously Presented) A diamond n-type semiconductor according to claim 1, wherein said first diamond semiconductor is monocrystal diamond.

12. (Currently Amended) A diamond n-type semiconductor according to claim 1, further comprising a second diamond semiconductor provided adjacent to said first diamond semiconductor and turned out to be n-type,

wherein, ~~in~~ said second diamond semiconductor, ~~a conductor exhibits~~ has an electron concentration not ~~negatively correlated~~ exhibiting a negative correlation with temperature and a Hall coefficient not ~~positively correlated~~ exhibiting a positive correlation with temperature, in the temperature range.

13. (Previously Presented) A semiconductor device at least partly employing a diamond n-type semiconductor according to claim 1.

14. (Previously Presented) An electron emitting device having the diamond n-type semiconductor according to claim 1 employed in at least an electron emitting part thereof.

15. (Currently Amended) A method of manufacturing a diamond n-type semiconductor, said method comprising the steps of:

preparing a diamond substrate; and

epitaxially growing a diamond semiconductor on said diamond substrate by vapor phase growth while artificially introducing an impurity element other than a donor element to said

diamond substrate, whereby said diamond semiconductor has n-type conduction and has a distortion or defect which is artificially formed therein,

wherein, ~~in~~ said diamond semiconductor ~~[[,]]~~ has an n-type dopant concentration adjusted by said vapor-phase growth such that a conductor exhibits an electron concentration negatively correlated an electron concentration of said diamond semiconductor exhibits a negative correlation with temperature, in a temperature range ~~which has~~ having a width of 100°C or more and which ~~[[is]]~~ included within ~~[[the]]~~ a temperature region from 0°C to 300°C.

16. (Original) A method of manufacturing a diamond n-type semiconductor according to claim 15, wherein Si is artificially introduced as the impurity element to said diamond substrate.